Cooperative LBA Atmospheric Regional Experiment (CLAIRE-UK)

Large-Scale Biosphere-Atmosphere Experiment in Amazonia

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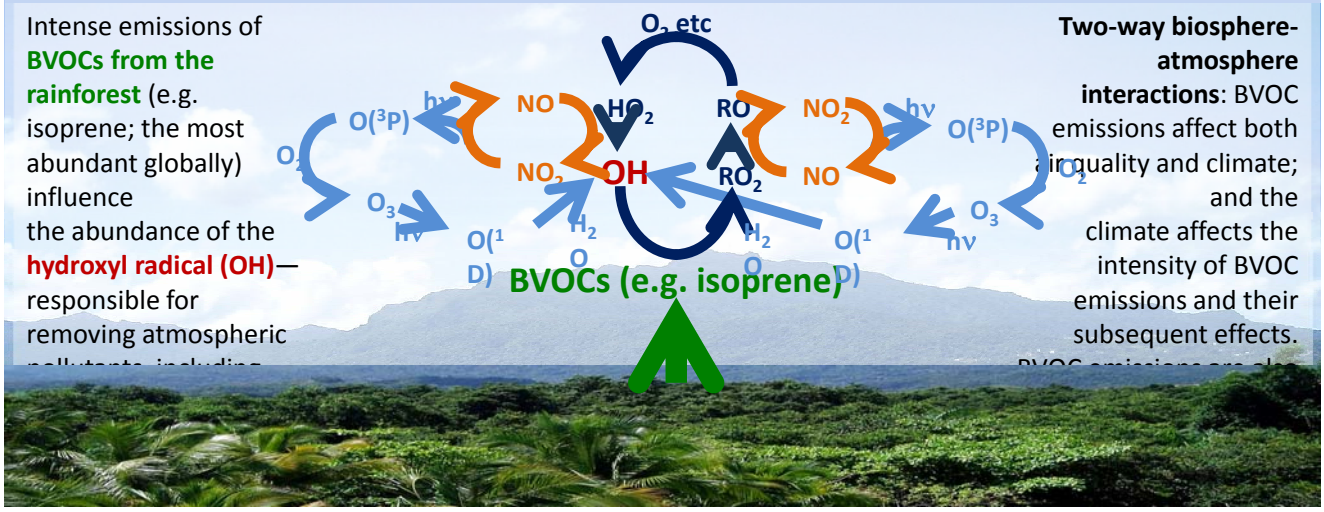
AIMS: TO IMPROVE OUR UNDERSTANDING OF THE INFLUENCE THAT BIOGENIC VOLATILE ORGANIC COMPOUNDS (BVOCs) EMITTED FROM THE AMAZON RAINFOREST HAVE ON ATMOSPHERIC COMPOSITION AND CLIMATE; AND TO EXPLORE HOW THIS MIGHT CHANGE IN RESPONSE TO FUTURE CHANGES IN CLIMATE AND LAND USE

BACKGROUND: ROLE OF ATMOSPHERIC CHEMISTRY IN BIOSPHERE-ATMOSPHERE INTERACTIONS

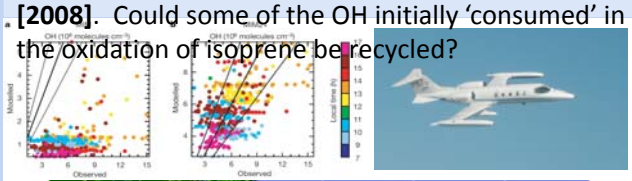
Intense emissions of **BVOCs from the rainforest** (e.g. isoprene; the most abundant globally) influence the abundance of the **hydroxyl radical (OH)**—responsible for removing atmospheric

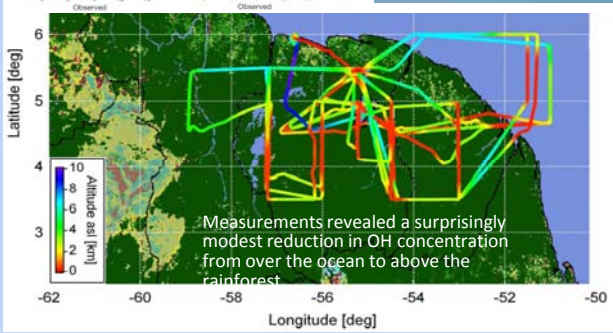


Two-way biosphere-atmosphere interactions: BVOC emissions affect both air quality and climate; and the climate affects the intensity of BVOC emissions and their subsequent effects.

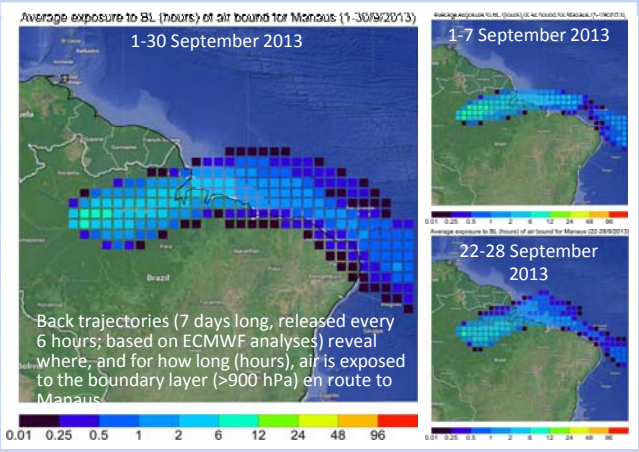
UNCERTAINTY: POSSIBILE RECYCLING OF OH

Airborne measurements during the Guyanas Atmosphere-Biosphere exchange and Radicals Intensive Experiment campaign in 2005 revealed much higher concentrations of OH above regions of intense isoprene emissions than simulated with an atmospheric chemistry-transport model employing the Mainz Isoprene Mechanism (MIM); see **Lelieveld et al. [2008]**. Could some of the OH initially 'consumed' in the oxidation of isoprene be recycled?





MODELLING: FROM LOCAL TO GLOBAL



We plan to first carry out **process-scale studies** using a Lagrangian model (the Cambridge Tropospheric Trajectory model of Chemistry And Transport; CiTTyCAT), exploring a range of chemical mechanisms of differing complexities. Then, implementing any insights gained from the modelling in conjunction with **field measurements**, we intend to use an Eulerian model to explore their **regional and/or global effects**—subject to both present- and future climate/land-use scenarios.

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